

AMENDMENT TO THE CLAIMS

1.(Currently Amended) A method of determining and applying a heat treatment ~~to apply~~ to a structural member, ~~so as to modify the~~ a deformation behaviour~~behavior~~ of the structural member when subjected to an applied stress, ~~the~~ said method comprising:

monitoring the structural member so as to generate monitored data;

simulating the deformation behaviour~~behavior~~ of the structural member when subjected to the applied stress using the monitored data;

simulating the effect of at least one heat treatment upon ~~the~~ at least part at least a region of the structural member ~~so as to determine a~~ [[:]]

determining a suitable heat treatment to apply to ~~the~~ at least part at least the region of the structural member, ~~to produce the~~ to produce a modified deformation behaviour~~behavior~~; and

applying the suitable heat treatment to the structural member.

2.(Currently Amended) ~~A~~The method according to claim 1, wherein ~~the simulation of~~ said simulating of the deformation behavior comprises uses is performed using a numerical modelling method.

3.(Currently Amended) ~~A~~The method according to claim 1, wherein ~~the simulation of~~ said simulating of the effect of at least one heat treatment uses is performed using a numerical modelling method.

4.(Currently Amended) ~~A~~The method according to claim 2, wherein the numerical modelling method comprises a finite elements method.

5.(Currently Amended) ~~A~~The method according to claim 1, wherein ~~the heat treatment is simulated with a localised~~ said simulating of the effect of at least one heat treatment uses a localized heat source.

6.(Currently Amended) A-The method according to claim 1, wherein ~~the heat treatment is simulated with said simulating of the effect of at least one heat treatment comprises uses~~ a moveable heat source.

7.(Currently Amended) A-The method according to claim 1, wherein said determining of the suitable heat treatment is determined~~comprises determining the suitable heat treatment such that the a simulated temperature generated in of the structural member during said applying of the suitable heat treatment is less than the a melting temperature for the material of the structural member.~~

8.(Currently Amended) A-The method according to claim 1, wherein ~~each heat treatment is defined by a parameter and wherein~~said simulating of the effect of at least one heat treatment comprises simulating the effect of a plurality of heat treatments by a number of heat treatments are simulated by varying the a heat treatment parameter to simulate the effect of the number heat treatments.

9.(Currently Amended) A-The method according to claim 8, wherein the heat treatment parameter is describes one of the a travel speed of the a heat source, the a heat input of the heat source, the a heat intensity distribution of the heat source, or the a maximum temperature of the heat source.

10.(Currently Amended) A-The method according to claim 1, wherein said determining of the suitable heat treatment is determined~~comprises determining the suitable heat treatment automatically.~~

11.(Currently Amended) A-The method according to claim 1, ~~wherein the method further comprises~~further comprising selecting one or more regions forming part of the structural member in accordance with ~~the simulated deformation~~said simulating of the deformation behavior.

12.(Currently Amended) ~~A-The~~ method according to claim 11, wherein said selecting of the one or more regions comprises selecting the one or more regions each region is selected in accordance with a deformation property.

13.(Currently Amended) ~~A-The~~ method according to claim 12, wherein the deformation property is ~~selected from a ductility, stress, strain, elongation- or, or~~ a fracture property.

14.(Currently Amended) ~~A-The~~ method according to claim 12 wherein each region is selected at a location in the structural member said selecting of the one or more regions comprises selecting the one or more regions in accordance with a threshold in of the deformation property.

15.(Currently Amended) ~~A-The~~ method according to claim 12, further comprising assigning a target threshold to the deformation property for each region.

16.(Currently Amended) ~~A-The~~ method according to claim 15, wherein said simulating of the deformation behavior of the structural member further comprising comprises repeatedly:

simulating the deformation behavior of the structural member having in accordance with the assigned deformation property target threshold in each region;

comparing the simulated deformation behavior with a desired behaviour; and, deformation behavior; and

assigning a new target threshold and/or new region(s); selecting one or more new regions, until the simulated deformation behavior is the desired deformation behaviourbehavior is simulated.

17.(Currently Amended) ~~A-The~~ method according to claim 15, wherein the said determining of the suitable heat treatment is determined so as to produce comprises determining a heat treatment which produces a deformation behaviourbehavior meeting the target threshold in each region.

18.(Currently Amended) ~~A-The method according to claim 17, wherein said simulating of the deformation behavior of the structural member further comprising comprises~~ repeatedly:

simulating the deformation behavior of the structural member ~~having in accordance with the assigned deformation property~~target threshold in each region;

comparing the simulated deformation with a desired ~~behaviour; and, deformation behavior;~~behavior; and

assigning a new target threshold and/or ~~new region(s); selecting one or more new regions,~~

~~until the desired deformation is simulated, wherein the deformation behaviour produced is the desired deformation behaviour~~ simulated deformation behavior is the desired deformation behavior, the desired deformation behavior being the deformation behavior meeting the target threshold in each region.

19.(Currently Amended) ~~A-The method according to claim 11, wherein the selection of each region is performed~~ said selecting the one or more regions comprises automatically selecting the one or more regions.

20.(Currently Amended) ~~A-The method according to claim 11, wherein said further comprising simulating of the deformation behaviour~~behavior of the structural member comprises simulating the deformation behavior of the structural member in ~~the~~a heat treated condition.

21.(Currently Amended) ~~A-The method according to claim 20, further comprising repeating the method to identify further~~ selecting one or more additional regions for subsequent heat treatment ~~in accordance with said simulating of the deformation behavior of the structural member in the heat treated condition.~~

Claim 22 (Cancelled).

23.(Currently Amended) ~~A-The method according to claim 22~~claim 1, wherein ~~the determined~~

~~heat treatment(s) are applied using a localised~~said applying of the suitable heat treatment
comprises utilizing a localized, controllable heat source.

24.(Currently Amended) ~~A-The~~ method according to claim 23, wherein the heat treatment(s) are applied usingsaid applying of the suitable heat treatment comprises utilizing a laser or induction coils.

Claim 25 (Cancelled).

26.(Currently Amended) ~~A-The~~ method according to claim 25, wherein theclaim 1, wherein said determining the suitable heat treatment comprises selecting a heat treatment for each region is selected the at least one region of the structural member from a group of predetermined heat treatments for the structural member.

27.(Currently Amended) ~~A-The~~ method according to claim 25, wherein theclaim 1, wherein said applying of the suitable heat treatment comprises applying the suitable heat treatment to a structural member includesincluding at least two substructural members welded together.

28.(Currently Amended) ~~A-The~~ method according to claim 25, wherein thestructural member isclaim 1, wherein said applying of the suitable heat treatment comprises applying the suitable heat treatment to a vehicle impact member.

Claims 29 – 42 (Cancelled).

43. (New) A computer readable medium encoded with a computer program for determining a heat treatment to apply to a structural member so as to modify a deformation behavior of the structural member when subjected to an applied stress, the computer readable medium causing a computer to execute a method comprising:

monitoring the structural member so as to generate monitored data;

simulating the deformation behavior of the structural member when subjected to the applied stress using the monitored data;

simulating the effect of at least one heat treatment upon at least a region of the structural member; and

determining a suitable heat treatment to apply to at least the region of the structural member to produce a modified deformation behavior; and

controlling application of the suitable heat treatment to the structural member.